Nicotine and smoking in patients with ulcerative colitis

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The chance observation in 1982 that very few patients with ulcerative colitis were current cigarette smokers[1] has encouraged much research into this association and the publication of a number of anecdotal reports. The new evidence has substantiated and expanded the original findings and has provided a new approach to investigate the pathogenesis of ulcerative colitis.

The original observation came from an investigation into the occurrence of lung disorders in patients with inflammatory bowel disease. Despite a high incidence of pulmonary abnormalities, only 11% of patients with ulcerative colitis were current cigarette smokers. In contrast, 36% of patients with Crohn's disease smoked, a figure similar to the national average.

Shortly after, Harries et al.[2] carried out a specific questionnaire survey and found that only 8% of ulcerative colitis patients were current cigarette smokers as compared with 42% of Crohn's disease patients and 44% of age- and sex-matched controls.

Following these reports, supporting anecdotal evidence linking non-smoking with ulcerative colitis was published. De Castella[3] described the case history of a 33-year old woman smoker who abruptly stopped and shortly afterwards developed the classic symptoms of ulcerative colitis.

Initially, nicotine was proposed as the active constituent of cigarette smoke responsible for this effect. This followed a report by Roberts & Diggle[4] of an individual for whom remission of symptoms could be induced equally by resuming cigarette smoking or by 16mg of nicotine per day delivered from nicotine chewing gum.

Since these original observations, international interest has been intense. There is no doubt that the risk of ulcerative colitis is very much lower among current cigarette smokers than among those who have never smoked, the estimated relative risk (RR) being 0.25 ($p<0.001$). There is also no doubt that such a reduction in risk is not evident in ex-smokers[5].

Although many theories have been advanced, little experimental evidence has been forthcoming to explain these findings. Based on the knowledge that colonic mucus is known to be quantitively and qualitatively abnormal in ulcerative colitis, and that cigarette smoking alters respiratory mucus by systemic as well as local effects, we have examined colonic mucus production in vitro in patients with ulcerative colitis. The results show that patients with ulcerative colitis have significantly lower colonic mucus production compared with controls. When smoking habits were taken into account, the majority of patients who were non-smokers had reduced mucus production compared with non-smoking controls. Those patients who did smoke had a level of colonic mucus production that was equivalent

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to smoking controls. Smoking appeared to have no effect on colonic mucus production in controls since both smokers and non-smokers had the same level of mucus production[6,7]. It would appear from these results that smoking does not affect mucus production under normal circumstances, but in a situation where mucus production is abnormal, as in ulcerative colitis, then smoking appears to have a restorative effect on mucus production. In vitro neither nicotine nor its major breakdown products had any effects on colonic mucus synthesis.

These studies suggest that smoking has profound influence on colonic mucus production, rendering patients' physical colonic mucosal defences relatively suppressed. These changes may well have relevance to the pathogenesis of inflammatory bowel disease.

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